(54) Title: METHOD AND DEVICE FOR WIRELESS TELECOMMUNICATION

(57) Abstract

The invention relates to the establishment of a wireless connection between two communication devices. Registration/authorisation data (530) must be exchanged between the devices before the devices can be connected to each other. This information exchange is initiated by bringing the devices in such physical proximity to each other (520) that a signal transmitted from at least one of the devices is received by the other device at a power level which exceeds a threshold level. The threshold level is chosen to a value being significantly higher than a minimally required power level for signal detection (500) in order to make sure that the devices are located very close to each other and thus enable an unambiguous association between them.

METHOD AND DEVICE FOR WIRELESS TELECOMMUNICATION

INTRODUCTION

The present invention relates generally to wireless telecommunication. More particularly the invention relates to

5   wireless exchange of registration/authorisation data between two communication devices prior to associating the devices with each other, via a wireless connection or a logical channel.

The invention also relates to a device, which functions in accordance with the proposed method.

10   **BACKGROUND**

Mobile communication and distributed data processing between mobile units constitute areas of telecommunication with very rapid growth. Since a radio interface now can be integrated onto a single and fairly cheap chip, there is also a trend

15   towards modularization and physical separation of units, which previously used to be co-located in one larger unit. Such modularization makes each sub-unit more versatile, since it can readily serve many units instead of just one. Furthermore, the modularization per se facilitates mobility. It also makes up

20   grading more cost efficient, since the sub-units may be up graded separately whenever necessary.

The so-called Bluetooth interface is an example of a modern radio interface, which was originally intended as a replacement for cables between units. The area of applicability has,

25   however, proven to be much wider. Bluetooth is a universal radio interface for operation in the unlicensed 2,45 GHz frequency band that enables portable electronic devices to connect and communicate wirelessly via short-range, ad hoc networks. Each device can simultaneously communicate with up to

seven other devices per piconet. Moreover, each device can simultaneously belong to several piconets.

A frequency hop transceiver is applied to combat interference and fading. A shaped, binary FM modulation is applied to minimise transceiver complexity. The gross data rate is 1Mb/s and a TDD (Time-Division Duplex) scheme is used for full-duplex

5　transmission.

The Bluetooth baseband protocol is a combination of circuit and packet switching. Slots can be reserved for synchronous packets. Each packet is transmitted in a different hop frequency. A packet nominally covers a single slot, but can be

10　extended to cover up to five slots. Bluetooth can support an asynchronous data channel, up to three simultaneous synchronous voice channels, or a channel which simultaneously supports asynchronous data and synchronous voice. Each voice channel supports 64 kb/s synchronous (voice) link. The asynchronous

15　channel can support an asymmetric link of maximally 721 kb/s in either direction while permitting 57,6 kb/s in the return direction, or a 432,6 kb/s symmetric link.

The Bluetooth technology, which originates from Ericsson, has gained the support of many other major suppliers, e.g. Nokia,

20　IBM, Toshiba and Intel. It eliminates the need for wires, cables and connectors for and between cordless or mobile phones, modems, headsets, PDAs (Personal Digital Assistants), computers, printers, projectors, local area networks, and so on, and paves the way for new and completely different devices

25　and applications.

A solution aiming to some extent in the same direction is presented by A. Harter et al in the article "A Distributed Location System for the Active Office", IEEE Network, Jan/Feb 1994. The article relates to a system for running location-

30　aware applications. The system allows people to move freely

between different computers and have their sessions/
applications brought with them from one computer to another as
they move. Every user in the system has a personal wireless
transmitter - a so-called active badge. The active badge

5   periodically transmits a radio or infrared message containing a
globally unique code. The active badge also has a receive
capability and can thus interpret a range of messages. Paging
and e-mail services are mentioned as examples of typical
applications. Other applications may be selected from a menu,

10   which appears as a list on a display upon user request. The
list of applications is personalised and configured in the
context of location and display type. Access to information
being stored in the various computers of the system is
controlled by authentication and authorisation mechanisms.

15   Personal agents may also be utilised to control the transfer of
information.

When a user device comes within range of more than one other
communication devices to which the user has authorised access,
the user must somehow indicate which, if any, of the available

20   devices and services he/she desires to use. In the known
systems a menu is presented to the user from which he/she
chooses one or more items representing the devices and/or
services.

It may, however, be very difficult for a user to interpret the

25   menu, since it is often far from obvious which item that
represents which devices or services. The absence of a
predefined ontology/taxonomy for devices further increases the
risk of confusion for the user.

Another problem may be to make room for a display that is large

30   enough to present all the available devices and/or services

intelligibly, particularly if the user device is relatively small, for instance, a wireless earphone.'

SUMMARY OF INVENTION

It is therefore an object of the present invention to overcome
the above-mentioned problems and facilitating the user's choice
of device or service/application.

5   The invention solves the problems by bringing the communication
devices in question in such physical proximity to each other
that a signal transmitted from at least one of the devices is
received by the other device at a power level which exceeds a
particular threshold level. In order to ensure a very close

10   proximity of the devices, and thus minimising the risk of
confusion, the threshold level is chosen to a significantly
higher power level than what is minimally required for
detecting the signals.

The invention provides a very intuitive and user-friendly

15   solution to the selection problem. The risk of unauthorised
access to devices and services is also decreased by the
invention. A third party device must namely come very close to
register itself at another communication device and it is
relatively easy to prevent unwanted user devises from

20   approaching within the registering range of the communication
device. The invention may preferably be applied in hardware
code keys such as dongles or one-way encryption key generators.
A log-on script may hence be effectuated simply by bringing the
hardware code key close enough to an access terminal.

25   Further scope of applicability of the present invention will
become apparent from the detailed description given
hereinafter. However, it should be understood that the detailed
description and specific examples, while indicating preferred
embodiments of the invention, are given by way of illustration

30   only, since various changes and modifications within the scope

of the invention will become apparent to those skilled in the
art from this detailed description.

BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1   illustrates the working principle of the invention
5   and shows a first embodiment of the invention;

Figure 2   shows a second embodiment of the invention;

Figure 3   illustrates a   sequence   for   establishing   a
            connection according to the invention;

Figure 4   shows a third embodiment of the invention;

10   Figure 5   shows a flowchart over the method according to the
            invention;

Figure 6   shows a flowchart over an embodiment of the method
            according to the invention;

Figure 7   depicts a device according to the invention;

15   Figure 8   depicts a set of exemplifying wireless interfaces
            according to the invention;

Figure 9   shows a first embodiment a device according to the
            invention;

Figure 10   shows a second embodiment a device according to the
20   invention; and

Figure 11   shows a third embodiment a device according to the
            invention.

The invention will now be described in more detail with
reference to preferred exemplifying embodiments thereof and
25   also with reference to the accompanying drawings.

DESCRIPTION OF PREFERRED EMBODIMENTS

In figure 1 is depicted a part of a telecommunications system
in which the inventive method can be carried out. Figure 1 aims
at explaining the working principle of the invention by means

of a communication example. The presumption here is that a user
wants to utilise a service, which his/her terminal 100 itself
cannot provide. For instance, the user may have received a
message 110, which he/she wants to print on a nearby printer

5   130. Typically, the message 110 has been transmitted to the
terminal 100 over a network 120. However, the message may have
been generated within the terminal 100 or have been placed in
the terminal 100 by other means, such as via a cable or a
wireline or alternatively via a storage medium, such as a

10   diskette, a CD (Compact Disc), a DVD (Digital Versatile/Video
Disc).

Instead of storing a complete intermediate copy of the message
in the terminal 100, it may function as a router for the
message. According to this embodiment of the invention only a

15   part of the message is at each time stored in the terminal 100
before being passed on further to the printer 130, which prints
out the message. The information storage requirements in the
terminal 100 may thus be alleviated considerably.

The printer 130 may be a stand-alone device or be connected to

20   a network 140. The printer 130 must nevertheless have at least
one wireless interface through which it can communicate with
external devices, such as the terminal 100.

According to the invention the user indicates his/her desire to
use the specific printer 130 by bringing the terminal 100 in

25   very close proximity to the printer 130. In a preferred
embodiment the terminal 100 is brought within 0,1 m from the
printer 130. When the communication devices (i.e. here the
terminal 100 and the printer 130) are separated by such a short
distance the wireless signals being transmitted from one device

30   are received by the other device at a power level, which is

much higher than a typical power level during regular
communication. Particularly, the power levels of the received
signals are significantly higher than a required minimum power
level for detection of the signal. A threshold level is set in
each device to represent a sufficiently short distance between
the transmitting and the receiving device. As soon as the power
level of a received signal exceeds this threshold level the
transmitting device is determined to be so close to the
receiving device that an unambiguous association can be made
between the transmitting and the receiving device. A detector
in each device senses when the threshold level has been
exceeded.

At this stage the device, which has one or more services to
offer (here the printer 130), will allow the other device
access to those services, provided that this device (here the
terminal 100) is authorised to use the service(s) (here
printing). In the general case a connection 150 will be
established between the two devices after a completion of a
successful registration/authorisation procedure. Once the
connection 150 has been set up the devices may be removed from
each other as far as is permitted by the device having the
shortest maximum communication range. If this range is exceeded
before the service has been completed the service may either be
terminated or placed on-hold depending on the preferences of
the user. A third alternative can be to route the connection to
a more suitable resource, within which range the user device
now is located. There are two alternative ways to communicate
the user's preferences in this respect. Either the preferences
are decided on beforehand or they can be settled on the
occasion. When the service has been completed two further
alternatives arise; either terminating the connection or

keeping it until the user actively indicates that it shall be broken. The different alternatives will be discussed in more detail with reference to figures 3 and 6.

Figure 2 illustrates a second embodiment of the invention, where information is transmitted mainly in the opposite direction as compared to figure 1, i.e. *from* a service-providing communication device *to* a service-requesting device, such as a mobile terminal 200. In this communication example a user controlling the mobile terminal 200 requests information 210 from a server 220. The information 210, in the form of e.g. a computer file, may either already reside on the server 220 or be transmitted there over a network 230.

Like in the previous example a registration/authorisation procedure is initiated between the mobile terminal 200 and the server 220 first when the mobile terminal 200 has been brought so close to the server 220 that a power threshold level has been exceeded. Provided that the registration/authorisation procedure determines that the mobile terminal 200 is permitted to access the information 210 a connection 240 is established between the devices 200 and 220. The connection 240 allows the mobile terminal 200 to again move so as to increase the distance to the server 220. The terminal must, however, stay within its own maximum communication range of and the server's 220 maximum communication range , whichever is shorter.

Practical applications of this embodiment of the invention are so-called information points, which a user can approach to gain particular data on a subject. For instance, the information point may be a piece of art in a museum or a famous monument at a tourist location.

So far, we have discussed one case where information is mainly

passed from a service-requesting communication device to a service-providing communication device and one case where information is mainly passed from a service providing-communication device to a service-requesting device. However, there are other communication devices, e.g. earphone/microphone headsets, modems and force-feedback game controllers, through which the flow of information is more symmetric. The invention is, of course, equally well applicable also in such cases.

In figure 3 is shown a sequence for establishing a connection between a mobile terminal 300 and a printer 310, which both have at least one wireless interface for exchanging information. In a preferred embodiment of the invention the wireless interface is a short-range radio interface according to the Bluetooth standard. However, the interface may be realised by any other means for wireless communication, such as radio, infrared, ultrasonic or hydrophonic. The HomeRF Shared Wireless Access Protocol (SWAP) and standards for cellular communication (e.g. GSM (Global System for Mobile telecommunication), D-AMPS (Digital Advanced Mobile Phone System), PDC (Pacific Digital Cellular), IS-95 (IS = International Standard) and IMT-2000 (IMT = International Mobile Telecommunications)) constitute direct alternatives to the Bluetooth standard.

Figure 5 shows a flowchart over the method according to the invention, which will be referred to in parallel with figure 3.

A transceiver unit in the printer 310 has a range 320 within which it can communicate wirelessly with other devices. At a first stage ① the mobile terminal 300 in figure 3 is presumed to be located outside the range 320 and cannot therefore exchange any information with the printer 310. The printer

regularly investigates whether a device is positioned within its range 320, e.g. listening for so-called connection initiation requests according to a specific hop-sequence or by transmitting a broadcast signal and listening for possible

5   responses thereto. This investigation corresponds to a first step 500 in figure 5. At second and somewhat later stage ②, the mobile terminal 300 has moved inside the range 320 and is now able to respond to signals transmitted from the printer 310 via a general communication resource 330, such as a control

10   channel. This corresponds to an affirmative answer to the question posed in step 500 of the method. The method then proceeds to a second step 510 in which general information is exchanged between the mobile terminal 300 and the printer 310. Typically, this is information regarding the identity of the

15   devices, i.e. the terminal 300 and the printer 310.

Nevertheless, data pertaining to the capabilities of the devices 300; 310 may also be exchanged. Services and applications can, for instance, be announced. In case a terminal functions as a router as described above, the

20   capabilities of the devices between which the connection is set up are preferably communicated to a remote server generating the service/application or from which the message originates.

A following step 520 in the method inquires whether the mobile terminal 300 has moved within a much closer range from the

25   printer 310 – a so-called selection range – within which the mobile terminal 300 and the printer 310 can be associated with each other and a connection between the devices 300; 310 can be established. A stage ③ in figure 3 shows the mobile terminal 300 being located within this selection range. The selection

30   range is defined as a threshold level for the power of a signal received over the wireless interface. If the received signal

from a particular device has a power level above the threshold
this is interpreted as the device being located within the
selection range.

The method loops back to step 520 until the mobile terminal 300
is determined to be within the selection range. The method then
proceeds to step 530 which checks whether the mobile terminal
300 is authorised to access the printer 310. The authority
control may be anything from comparing the mobile terminal's
identity with an access control list, which is positive and/or
negative (i.e. including identities with permitted access
respective identities having no access), to complex
authentication and encryption schemes. The more simple forms
authority control are preferably carried out automatically,
whereas the more advanced forms must be performed in several
steps of which some require user intervention. The exchange of
authorisation data is schematically illustrated by a wireless
transmission 340 in figure 3. According to a preferred
embodiment of the invention the authorisation step is initiated
first when the threshold level has been exceeded during a
continuous time period of a predetermined length, e.g. 3
seconds. In order to achieve a higher level of security the
user may also be informed of the commencing authorisation by
some kind of alerting signal. This signal can be an optical
indication, an acoustic indication or a mechanical indication,
such as vibration. The user is then given the option to either
confirm or refuse the selection via some kind of interaction
means, such as a button, a menu or a voice command.

The authentication can, for instance, be performed by means of
a credit card. This is particularly useful since the same
credit card may also be charged for the service associated with
the authentication. A straightforward alternative to the credit

14

card authentication can be to authorise a device against
another device by simply inserting an amount of coins or bills
into the other device.

The authorisation step 530 may have one of four different
5   outcomes; a first where the mobile terminal 300 is refused all
access to the printer 310, a second where the terminal 300
gains access to a specific application provided by the printer
310, e.g. printing black & white postscript documents only, a
third where the terminal 300 gains access to a set of services
10   provided by the printer 310, e.g. any kind of ink jet printing,
and a fourth where the terminal 300 gains access to all
services provided by the printer 310. If the authorisation
succeeds, i.e. the mobile terminal 300 is allowed to access one
or more services/applications at the printer 310, the method
15   continues to step 540. In this step specific information is
exchanged between the printer 310 and the terminal 300.
Typically, this information is more detailed data about the
capabilities of the involved devices 300; 310, for instance the
terminal 300 may be informed about the technical performance of
20   the printer and of what services and/or applications that can
be used.

In the most general description of the method according to the
invention one or more of the steps 510, 530 and 540 may be
empty. I practice, this means that no general information is
25   exchanged between the devices before coming within the
selection range, no authorisation check is performed (i.e. all
devices are allowed to connect) respective no specific
information, such as capability data, is exchanged after the
authorisation.

30   After the step 540 follows a step 550 in which a wireless

connection 350 is established between the printer 310 and the
terminal 300. When the connection 350 has been established the
terminal may move around arbitrarily within the range 320. The
wireless connection 350 is indicated by a stage ④ in figure 3.

5   If the terminal 300 leaves the range 320, at stage ⑤, the
wireless connection 350 is either terminated or placed on-hold
until the terminal 300 re-enters the range 320 (or possibly a
timer expires).

Naturally, it is envisaged that a plurality of devices may
10   request access to a specific device, e.g. a printer, at the
same time or at least during overlapping time periods. It is
then necessary to organise a queue at the device in question.
Preferably, the device therefore includes a cache memory for
storing data until it can be further processed, e.g. printed. A
15   user could be notified that the device is ready for processing
his/her particular task by means of an SMS-message (SMS = Short
Message Service under GSM). Another alternative is to require
that a user must be located within the communication range of
the serving device in order to have his/her job task processed.
20   The user's absence is, after a pre-determined interval,
interpreted as a lack of interest of actually having the job
task executed. The device therefore instead proceeds to the
following job task after the lapse of the pre-determined
interval.

25   Figure 4 shows an embodiment of the invention corresponding to
the arrangement shown in figure 3. Here, however, a general
service point 410 has replaced the printer 310. It is namely
sometimes more practical to separate the transceiver unit from
the unit offering the actual services/applications. By such
30   separation a transceiver unit can be placed at an easily
accessible service point 410 and the server unit 420 per se can

be placed at a secure and physically less accessible location, within or outside the range 430 of the transceiver unit. The service point 410 and the server unit 420 communicate via a connection 440, which preferably, but not necessarily, is a

5   wireline connection.

The printer 310 in figure 3 and the server unit 420 in figure 4 may, of course, be any communication device to which it is reasonable to connect another communication device. For instance, the device could be a screen plus possibly a

10   keyboard. A user having a mobile device could then connect his/her device to the screen for viewing information that is difficult to present on the mobile device. Preferably, the screen is co-located with other communication and presentation devices, such as a facsimile machine and a printer, in some

15   kind of "communication booth". The user gains access to the devices in the booth after paying a fee in cash or from a credit card. The user's session at the booth is preferably terminated when the mobile device is removed from the booth's communication range. In connection with this event it is also

20   desirable that all data having been temporarily stored in the devices in the booth is deleted.

A flowchart over an embodiment of the method according to the invention is shown in figure 6. The embodiment encompasses the events that occur after that a connection has been established

25   according to the method described with reference to figure 5 above.

A first step 600 enables a particular service or application, either automatically or upon request from a user. A following step 610 inquires whether the devices are located within each

30   other's communication ranges. If so, a step 620 follows, which

checks whether the service/application is completed. In case it is yet not completed the method is looped back to step 600, where the service/application continues. Otherwise the method moves on to a step 630, which interrogates whether the connection shall be terminated, i.e. disconnected. Either the user is asked explicitly if he/she wishes to maintain the connection also after completion of the service/application or the choice has been made on beforehand and is merely effectuated at this stage.

If, in step 610, it is found that the devices are separated by a distance being larger than the shortest maximum communication range for the involved devices, the method continues to a step 640. This step has three alternative exits, a first of which involves looping the method back to step 610 where it waits for the devices to re-enter each other's communication ranges. A second alternative implies that the service/application is ended and that the connection is terminated. A third alternative involves roaming to a neighbouring server unit, which continues to deliver the service/application. In practice this means that the method is brought back to step 530 in figure 5. Either the user is prompted to choose among these alternatives as the user's device leaves the range or the user has already predefined his/her preferences, so that the appropriate alternative can be chosen automatically.

Figure 7 shows a communication device 700 according to the invention. A unit having a radio interface towards external devices here exemplifies the device 700. However, the device 700 may alternatively communicate externally via any of the other wireless interfaces mentioned previously.

The device 700 includes a radio unit 710, e.g. a Bluetooth

radio chip, an antenna 720 and a storage 730, e.g. a digital memory unit. The radio unit 710 is connected to the antenna 720 via an antenna filter 740, which functions as an input filter that automatically dampens an incoming radio signal if its
5 power level exceeds a threshold value. This prevents the receiver circuitry from overloading. A detector 750 senses when the threshold level is exceeded and is, according to a preferred embodiment of the invention, activated first when the threshold level has been exceeded during a continuous time
10 period of a predetermined length, e.g. three seconds. The preferred embodiment of the inventive device furthermore includes at least one alerting means 750a, 750b or 750c for indicating to a user that the detector is activated and that a registration/authorisation procedure will be initiated shortly
15 between the device 700 and another communication device. The alerting means can be an optical indicator 750a in the form of a LED (Light Emitting Diode); an acoustic indicator 750b in the form of a buzzer or a speaker; or a mechanical indicator 750c in the form of a vibrator unit.

20 The storage 700 holds an access control list of device identities, which defines what devices that may exchange information with and use services and/or applications on the communication device 700. The access control list may be exclusively positive, i.e. contain only identities that are
25 permitted to communicate with the device 700, exclusively negative, i.e. contain only identities that shall be prevented from communicating with the device 700 or be a combined list, i.e. contain some identities that may communicate and some that may not. The access control list is checked via an interface
30 760 between the radio unit 710 and the storage 730 as part of the registration/authorisation step according to the inventive

method. The radio unit also has at least one interface 770 for sending and receiving payload and control information to and from other parts of the communication device 700.

Figure 8 illustrates the fact that the invention can utilise
5   many different wireless interfaces for detecting when a first communication device 800 and a second communication device 810 are located sufficiently close to each other in order to unambiguously associate the devices 800; 810 with each other and establish a connection between them. The wireless interface
10 may be a regular radio interface 820, normally used for communication in a cellular system. The wireless interface may also be a short-range radio interface 830, e.g. a Bluetooth interface or the wireless interface may be a light interface 840, e.g. IR (InfraRed). A respective detector 850; 860 senses
15 when a threshold level is exceeded for one or more of the interfaces 820, 830 and 840. Although it is preferred to employ the same interface that has been used to determine the proximity of the devices also for connecting the devices it is not necessary to do so. The connection may very well be
20 established over a different interface. A Bluetooth interface can, for instance, be used during the registration/ authorisation procedure whereas a cellular interface can be used to establish the connection.

Figure 9 shows a first embodiment a communication device 900
25 according to the invention, which is equipped with two wireless interfaces. In order to reduce the risks of interfering with other devices during the registration/authorisation procedure a narrow light beam 910 is used for the initial steps of the method, e.g. steps 500 – 540 in figure 5. A connection is then
30 established over a radio interface 920 to ensure good coverage during the remaining part of the session.

Figure 10 shows a second embodiment of a communication device
1000 according to the invention. A sub-unit 1010 of the device,
which includes a wireless interface 1020, is here extensible
from the rest of the device 1000 to which it is connected via a

5   cable 1030. This solution is particularly suitable when the
other communication device that is to be wirelessly connected
to the device 1000 is located relatively close, but is not
readily accessible by the entire device 1000. This embodiment
namely makes it possible to pull out the sub-unit 1020 and

10 bring   it   close   to   the   other   device   during   the
registration/authorisation procedure and the return the sub-
unit 1020 to the device 1000 when a connection has been
established.

Figure 11 shows a third embodiment of a communication device

15 1100 according to the invention. A sub-unit 1110 is removable
from the main device 1100 also in this embodiment of the
invention. However, apart from a wireless interface 1120 the
sub-unit 1110 also includes a memory unit and a micro battery.
Therefore the sub-unit can be brought far away from ① the main

20 device 1100 during the registration/authorisation procedure
after which it is returned ② and a connection can be
established. When the sub-unit 1110 is attached to the main
device 1100 again the wireless interface 1120 can increase its
transmitting power and receiver sensitivity by means of

25 amplification circuitry and power sources in the main device
1100. This solution is particularly suitable when the
communication device 1100 is attached to a fairly large object,
such as a vehicle, and cannot be brought close enough to the
other communication device by any other means.

30 The invention being thus described, it will be obvious that the

same may be varied in many ways. Such variations are not to be regarded as a departure from the scope of the invention, and all such modifications as would be obvious to one skilled in the art are intended to be included within the scope of the

5 following claims.

CLAIMS

1. Method for establishing a connection between a first communication device (300) and a second communication device (310) over a wireless interface (350), the method including a step (530) in which registration/authorisation data is exchanged wirelessly between the communication devices (300; 310), **characterised in that**

the registration/authorisation step (530) is initiated by bringing the communication devices (300; 310) in physical proximity to each other such that a signal transmitted from at least one of the devices is received by the other device at a power level which exceeds a particular threshold level,

the threshold level being significantly higher than a required minimum power level for signal detection (320), and

the registration/authorisation step (530) is initiated first when the threshold level has been exceeded during a continuous time period of a predetermined length.

2. Method according to claim 1, **characterised in that** after the registration/authorisation step (530) follows a step (550) in which the first communication device gains access at least one resource at the second communication device.

3. Method according to claim 2, **characterised in that** a set of services provided by the second communication to which the first communication device gains access is determined by an access control list held in the second communication device.

4. Method according to claim 2 or 3, **characterised in the** first communication device gains access to all services of a particular class provided by the second communication device.

5. Method according to claim 2 or 3, **characterised in the**

first communication device gains access to a specific application provided by the second communication device.

6.   Method according to any of claims 1 - 5, **characterised in that** an attentive signal indicating that a registration/ authorisation may be taken is emitted from at least one of the communication devices (300, 310) before the registration/ authorisation step is initiated.

7.   Method according to claim 6, **characterised in that** the attentive signal is an acoustic signal.

8.   Method according to claim 6 or 7, **characterised in that** the attentive signal is an optical signal.

9.   Method according to any of claims 6 - 8, **characterised in that** the attentive signal is a mechanical signal.

10. Method according to any of claims 1 - 9, **characterised in that** the registration/authorisation step (530) is initiated first when an automatic signal damping function for the received signal has been activated in at least one of the communication devices.

11. Method according to claim 10, **characterised in that** the registration/authorisation step (530) includes transferring money from a credit card or in the form of cash.

12. Method according to any of claims 1 - 11, **characterised in that** the registration/authorisation step includes checking an identity of at least one of the devices against an access control list stored (730) in the other device.

13. Method according to any of claims 1 - 12, **characterised in that** the registration/authorisation step (530) includes a sub-

step in which the first device is authorised against the second device.

14. Method according to claim 11 or 13, **characterised in that** the access control list includes one or more authorised
5   identities.

15. Method according to any of claims 11 - 14, **characterised in that** the access control list includes one or more non-authorised identities.

16. Communication device for establishing a connection between
10   itself and at least one other device over a wireless interface, including

at least one transceiver (710), the transceiver communicating information over the wireless interface; and

a detector (740), the detector registering when the power
15   level of a signal received over the wireless interface exceeds a threshold level, **characterised by**

the detector (740) being a signal damper, which is automatically activated when the power level of a received signal exceeds a particular power level,
20   a registration/authorisation procedure being triggered in case the power level is exceeded, and

the registration/authorisation procedure being performed between the communication device and the other device over the wireless interface.

25   17. Communication according to claim 14, **characterised by** further including

a memory unit (730) for holding an access control list being indicative of which devices that are permitted to exchange information with the communication device, the access
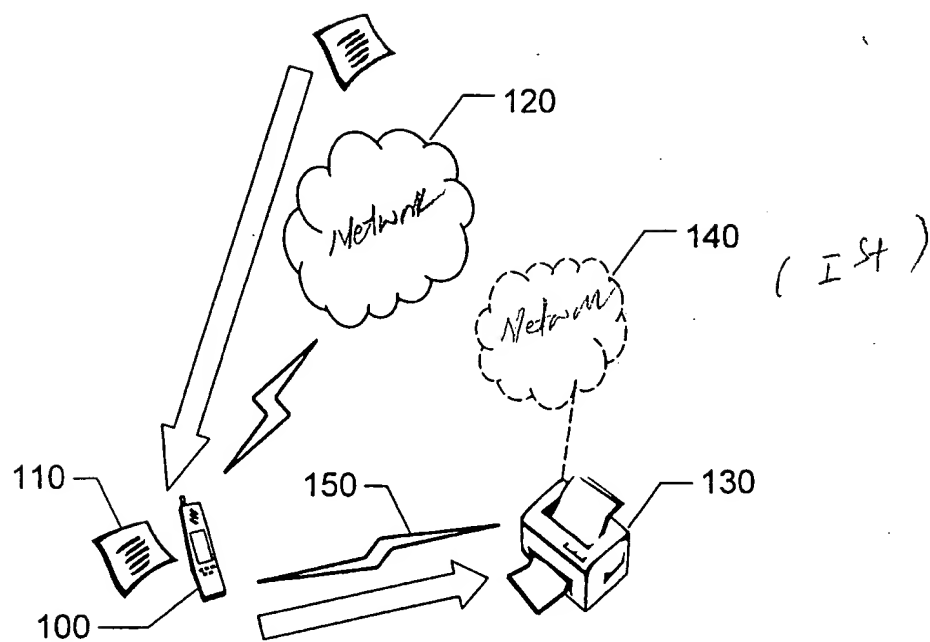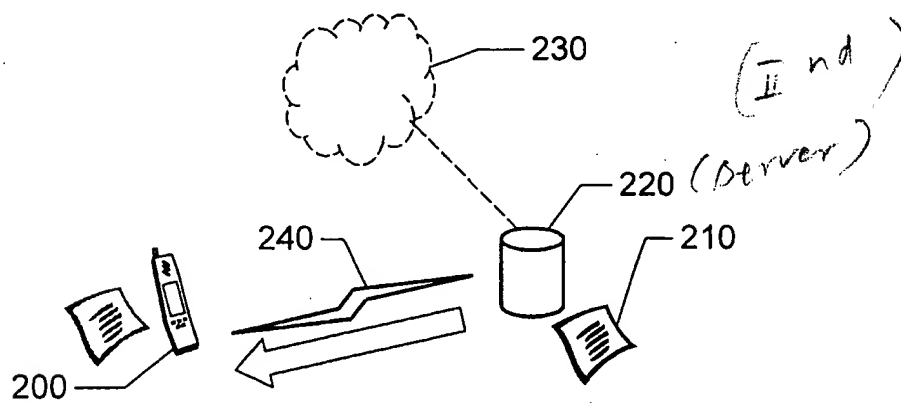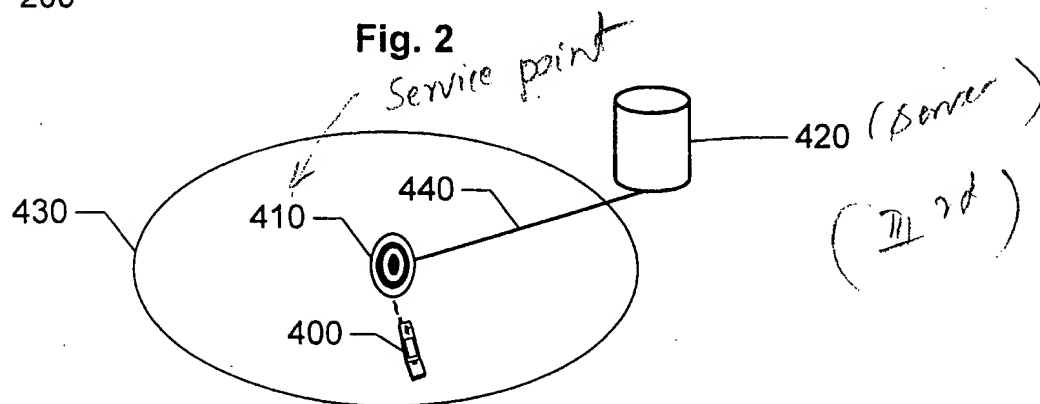30   control list being read during the registration/authorisation
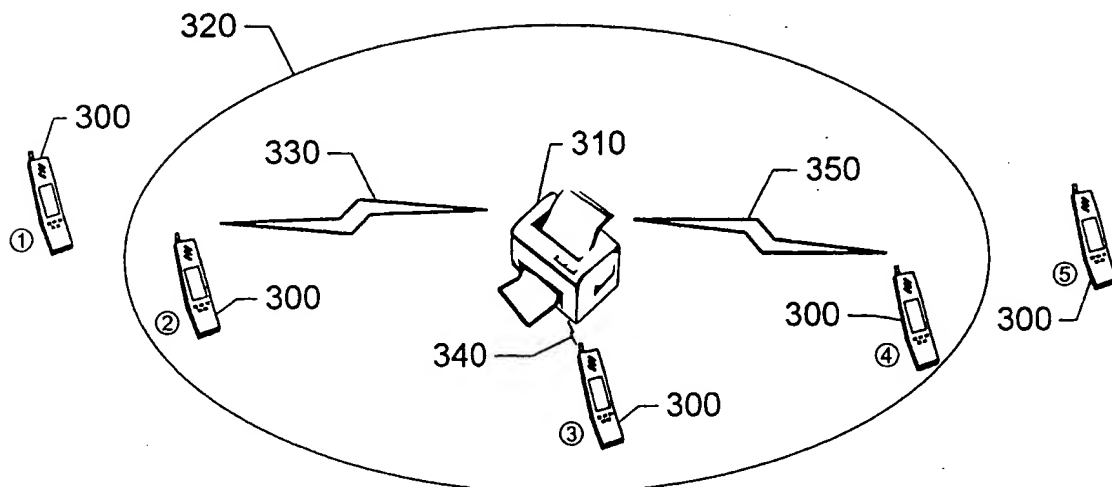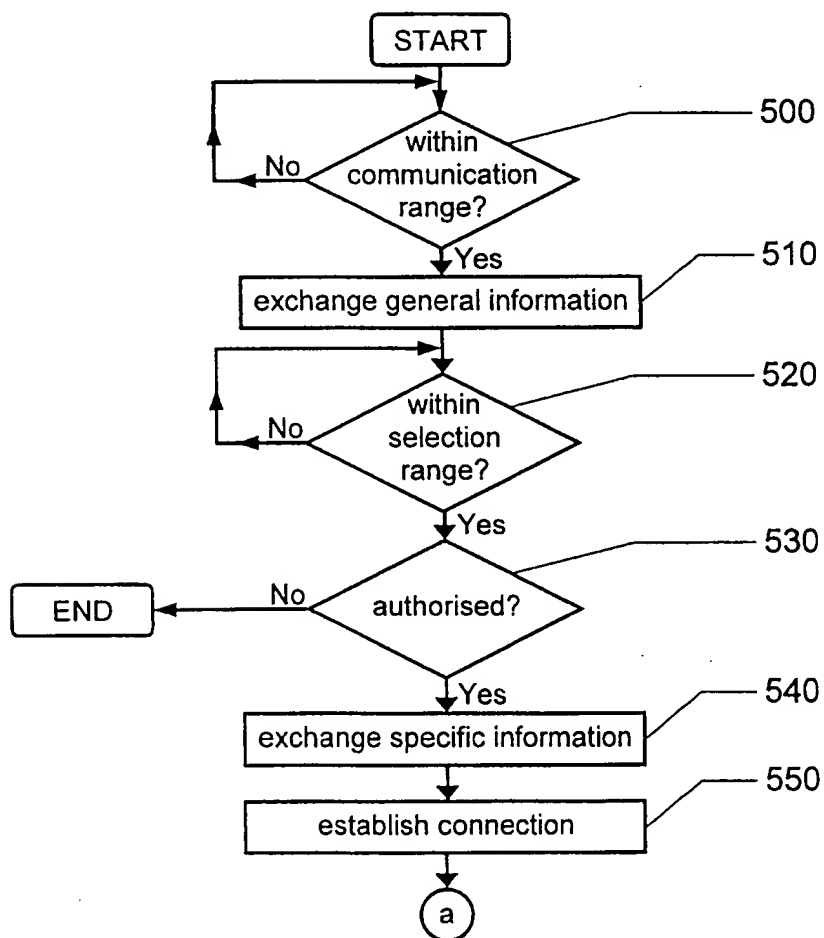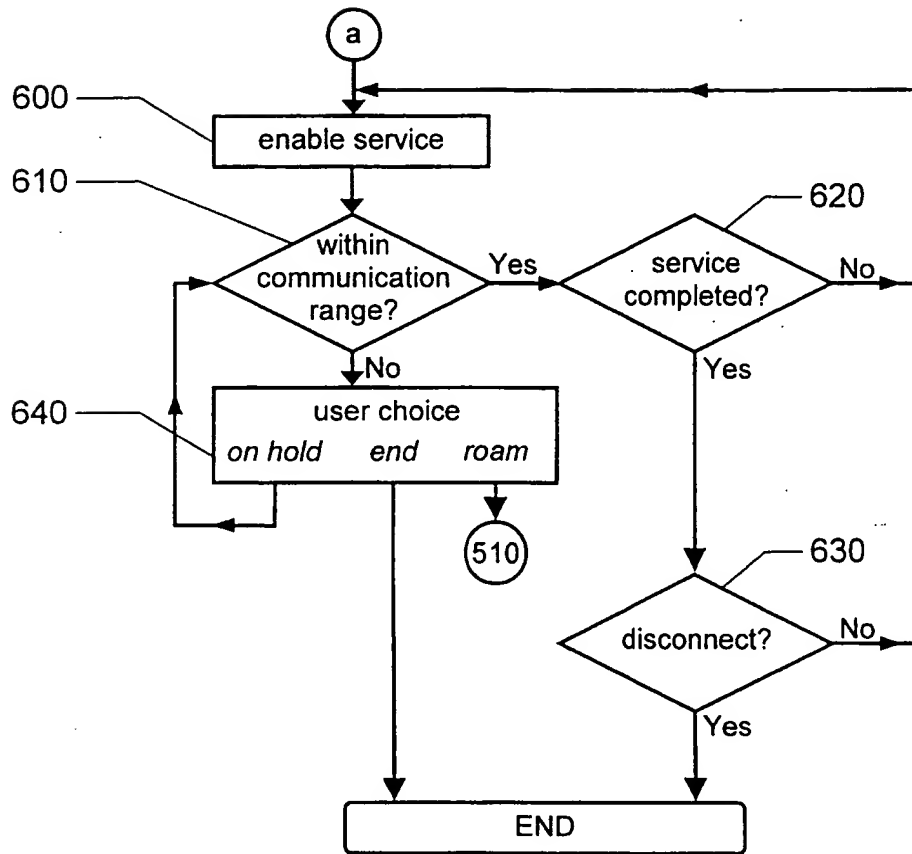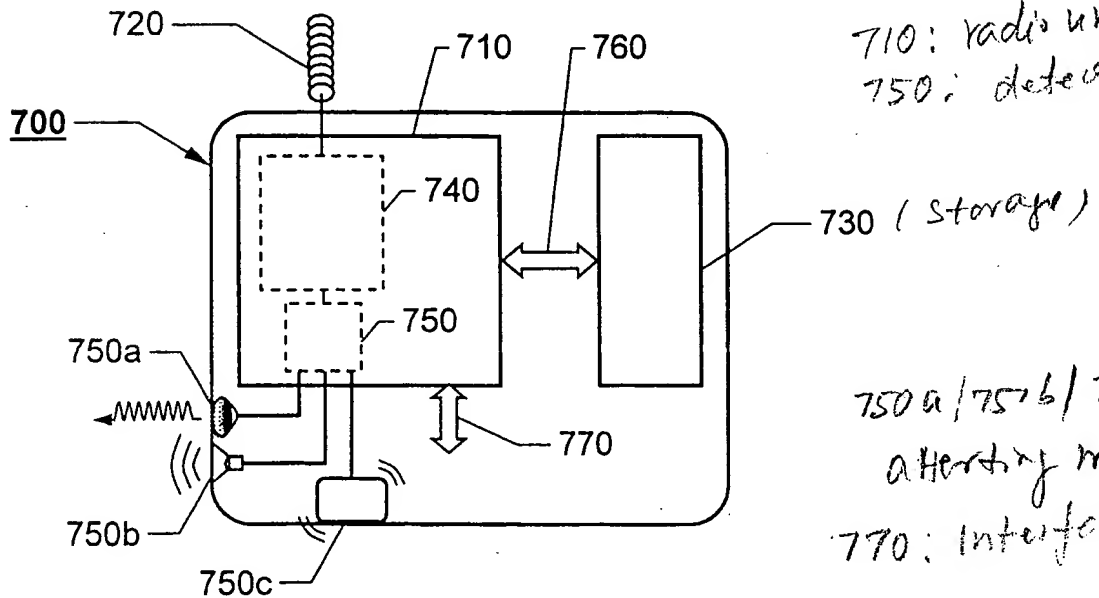
procedure.

Fig. 1

(I st)

Fig. 2

(II nd)

(Server)

Fig. 4

(Server)

(III rd)

2/4

Fig. 3

Fig. 5

Fig. 6

Fig. 7

710: radio unit
750: detector

730 (storage)

750a/750b/750c:
alerting means
770: Interface

Fig. 8

Fig. 9

(I^{st})
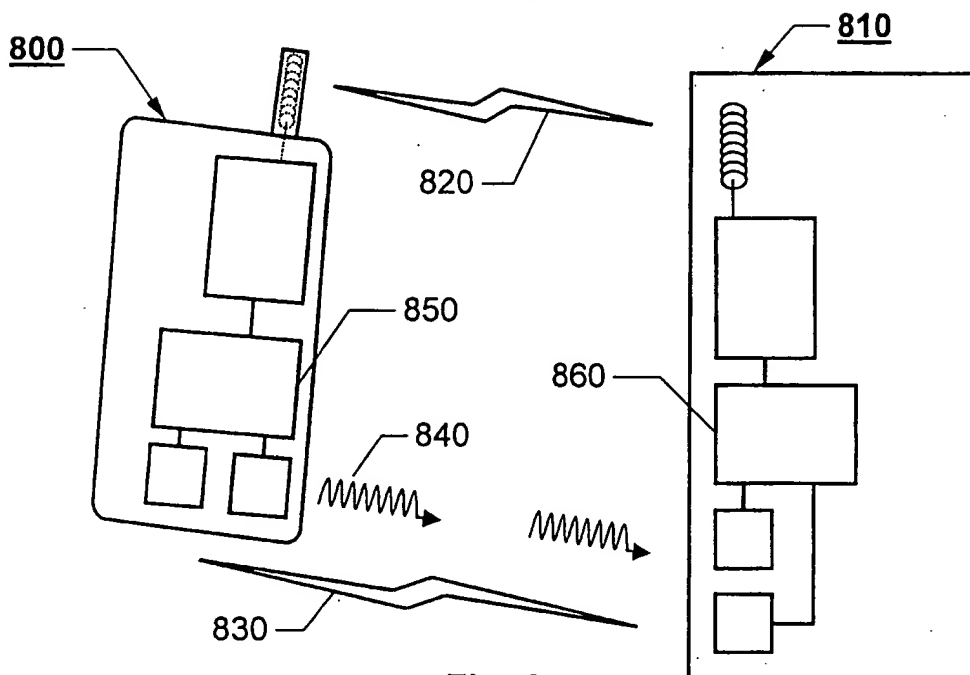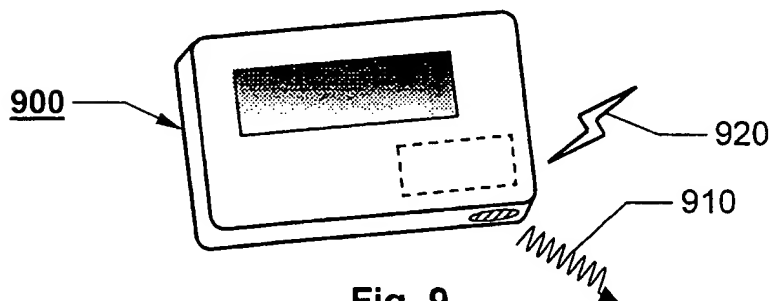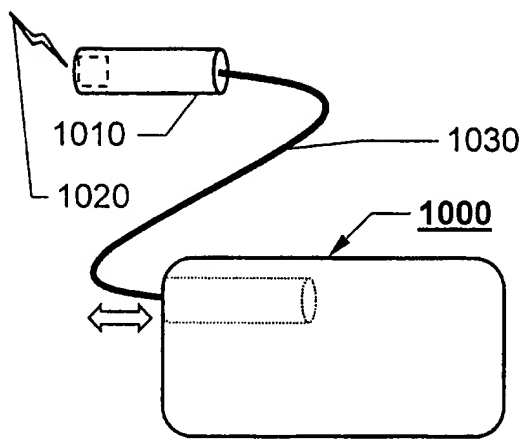
Fig. 10
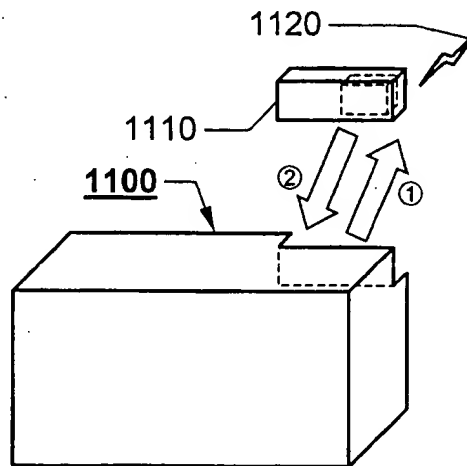
(IInd)

Fig. 11

(IIIrd)

INTERNATIONAL SEARCH REPORT

A. CLASSIFICATION OF SUBJECT MATTER

IPC7: H04L 12/26, H04Q 7/32

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC7: H04B, H04L, H04Q

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

SE,DK,FI,NO classes as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	WO 9817032 A1 (MOTOROLA INC.), 23 April 1998 (23.04.98), page 4, line 20 - page 5, line 24; page 6, line 3 - page 9, line 35; page 10, line 30 - page 13, line 24, abstract	1-5,12,15
A		6,7,13,14,16
	--	
Y	US 5611050 A (MARVIN M. THEIMER ET AL.), 11 March 1997 (11.03.97), column 5, line 61 - column 8, line 28; column 11, line 16 - line 48; column 23, line 56 - column 27, line 33, abstract	1-5,12,15
A		13,14,16
	--	

[X] Further documents are listed in the continuation of Box C.   [X] See patent family annex.

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" erlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance: the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance: the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
1 August 2000	03 -08- 2000
Name and mailing address of the ISA/ Swedish Patent Office Box 5055, S-102 42 STOCKHOLM Facsimile No. + 46 8 666 02 86	Authorized officer Bo Gustavsson/AE Telephone No. + 46 8 782 25 00

Form PCT/ISA/210 (second sheet) (July 1992)

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 5430761 A (EUGENE J. BRUCKERT ET AL.), 4 July 1995 (04.07.95), column 2, line 7 - line 32; column 5, line 21 - line 36	1,2,5,12,15
A		3,4,16
	--	
Y	US 5386457 A (GEORGE P. COTSONAS ET AL.), 31 January 1995 (31.01.95), column 5, line 3 - column 9, line 8, abstract	1,2,5,12,15
A		6,8
	-- ---------	

International application No.
PCT/SE 00/00371

Patent document cited in search report			Publication date	Patent family member(s)			Publication date
WO	9817032	A1	23/04/98	AU	4270897	A	11/05/98
				EP	0932960	A	04/08/99
US	5611050	A	11/03/97	US	5544321	A	06/08/96
				US	5555376	A	10/09/96
				US	5603054	A	11/02/97
				US	5717955	A	10/02/98
US	5430761	A	04/07/95	DE	69226012	D,T	17/12/98
				EP	0546720	A,B	16/06/93
US	5386457	A	31/01/95	CA	2067560	A,C	24/11/92